Amendments to the Drawings:

The attached five (5) Replacement sheets of drawings for Figs. 1 to 3, 8, and 9 are submitted in response to the drawing objections as to a the spelling out of the acronym HDL in Fig. 1, and as to labels designating Figs. 1 to 3, 8, and 9 as prior art, as detailed in the Office Action. Approval and entry are respectfully requested, and withdrawal of the objections is respectfully requested.

Attachment: Five (5) Replacement Sheets

REMARKS

I. Introduction

With the cancellation of claim 182 and the addition of claim 203, claims 179 to 181 and 183 to 203 are currently pending in the present application, since claims 1 to 178 were previously canceled. In view of the foregoing amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration of the present application is respectfully requested.

Applicants note with appreciation the acknowledgement of the claim to foreign priority and the indication that all certified copies of the priority documents have been received.

Applicants thank the Examiner for considering the previously filed Information Disclosure Statements, 1449 papers, and cited references. However, with respect to EP 0 221 360, listed on page 7 of the 1449 paper mailed October 8, 2004, and with respect to DE 196 51 075, listed in the 1449 paper mailed December 10, 2001, the Examiner has not initialed these listings, and it is not clear whether the Examiner has considered these references. However, it is believed and respectfully submitted that these references have been properly cited, and consideration of these references is respectfully requested. Applicants respectfully request an initialed copy of these PTO-1449 papers, initialed to clearly indicate that all of the references listed therein have been considered.

II. Objections to the Drawings

Replacement sheets of drawings are submitted to address the objections to the drawings. Fig. 1 has been amended herein without prejudice to spell out the acronym HDL. Figs. 1 to 3, 8, and 9 have been amended herein without prejudice to include labels designating the figures as prior art. No new matter has been added. Approval and entry are respectfully requested. Withdrawal of the objections is therefore respectfully requested.

III. Objections to the Specification

The Abstract has been amended herein without prejudice to obviate the present objection to the Abstract.

The Title of the invention has been amended herein without prejudice to obviate the present objection to the Title.

With respect to the objections to the "Area of Application" and "Detailed Description of an Example Embodiment" headings, while Applicants do not necessarily agree

with the objections, these headings have been amended herein without prejudice to obviate the present objections to these headings.

With respect to the objection to the "Background Information" heading, Applicants request that the Examiner point to a particular rule upon which the Examiner relies as the basis for the objection to the heading. Section 608.01(c) of the M.P.E.P., for example, indicates that a background of the invention section *ordinarily* comprises two parts, a Field of the Invention part and a description of the related art, etc. While this section indicates what is ordinarily included in the background section, it does not indicate that this information is required to be included in the background section, and certainly does not indicate that it is required to include an explicit heading pointing out which part, if any, of the background section constitutes a description of the related art. Accordingly, it is respectfully submitted that no amendment to the heading "Background Information" is required.

With respect to the objection to the description, in the brief description of the drawings, of a figure's individually numbered parts by reference to the general figure number, section 608.01(f) of the M.P.E.P. states that "[i]f a figure contains several parts, for example, figure 1A, 1B, and 1C, the figure may be described as figure 1." Accordingly, it is respectfully submitted that the brief description of the drawings is proper and an amendment to the brief description of the drawings is not required.

With respect to omission of a "Brief Summary of the Invention" section, 37 C.F.R. § 1.77 states "[t]he elements of the application, if applicable, should appear in the following order: . . .". "The phrase 'if applicable' is inserted in the heading, rather than associated with any particular listed element, to clarify that § 1.77 does not per se require that an application include all of the listed elements, but merely provides that any listed element included in the application should appear in the order set forth in § 1.77." 61 Fed. Reg. at 42793. Indeed, it is respectfully submitted that there is no requirement for a patent application to include a "Brief Summary of the Invention" section, and, thus, an amendment to include this section is not required.

With respect to the objection to acronyms in the specification that have not been spelled out, the Specification has been amended herein without prejudice to obviate this objection.

With respect to the objection to the remarks of the Preliminary Amendment, dated June 17, 2002, the amendment was filed prior to the July 30, 2003 date on which the revised rule 121 took effect requiring a separate sheet of paper for the listing of claims. In

any event, Applicants thank the Examiner for considering the amendments presented in the Preliminary Amendment.

Withdrawal of these objections is therefore respectfully requested.

IV.   Objection to the Claims

With respect to the objection to the listing of claims of the Preliminary Amendment, dated June 17, 2002, the amendment was filed prior to the July 30, 2003 date on which the revised rule 121 took effect requiring a separate sheet of paper for the listing of claims. In any event, Applicants thank the Examiner for considering the claims presented in the Preliminary Amendment.

With respect to the objection to claim 194, claim 194 has been amended herein without prejudice to obviate the present objection.

Withdrawal of the objections to the claims is therefore respectfully requested.

V.   Rejection of Claim 180 Under 35 U.S.C. § 102(b)

Claim 180 stands rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,021,947 ("Campbell et al."). It is respectfully submitted that Campbell et al. do not anticipate claim 180 for at least the following reasons.

Claim 180 relates to a method for programming a system having a cellular structure, and has been amended herein without prejudice to include subject matter of canceled claim 182 to recite, *inter alia*, the following:

> *. . . separating the data flow graph into a plurality of subgraphs . . .*
> *wherein the separating step includes separating the data flow graph*
> *so as to minimize connections between the plurality of subgraphs.*

Campbell et al. do not disclose, or even suggest, these features, and therefore do not anticipate claim 180.

With respect to the subject matter of claim 182 (which is now incorporated in amended claim 182), the Examiner cites the combination of U.S. Patent No. 5,966,534 ("Cooke et al.") and U.S. Patent No. 6,421,809 ("Wuytack et al.") as rendering claim 182 obvious. In support of the rejection, the Examiner asserts that Wuytack et al., at column 14, lines 31 to 41, and column 22, lines 6 to 27, disclose the feature of the separating step including separating the graph so as to minimize connections between the plurality of subgraphs. Without addressing whether Wuytack et al. qualifies as prior art with respect to the sections of Wuytack et al. relied upon by the Examiner, it is respectfully submitted that

the combination Campbell et al. and Wuytack et al. does not render unpatentable claim 180 for at least the following reasons.

To establish a *prima facie* case of obviousness, the Office Action must demonstrate three criteria: (1) there must be some suggestion or motivation to one of ordinary skill in the art to modify a reference or to combine reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art reference (or references when combined) must teach or suggest each and every limitation in the claim under examination. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Wuytack et al. relate to optimizing a memory structure and optimizing a scheduling of data accesses to the memory, so that execution of the data access is guaranteed for its allotted cycle, where such guarantee is provided by ensuring that any conflict within a cycle is accounted for.

In optimizing the memory structure, power cost of the memory is considered. Such costs include a number of data accesses and a size of data to be accessed. Therefore, if a large data, the data access of which is seldom required, is stored in a same memory block as a small data, the data access of which is often required, this combination wastes power. Column 14, lines 31 to 41 (the first of the sections cited by the Examiner as assertedly disclosing the separating step feature of canceled claim 182) therefore provides for determining which data is to be grouped together using as a factor a power cost term, which is, for example, $Size(BG_1)*Accesses(BG_2)+Size(BG_2)*Accesses(BG_1)$. This term is used to ensure that there is no power waste. It therefore provides for minimizing the storing in a single memory large data having low access numbers with small data having large access numbers. This does not disclose separating data flow graphs to minimize connections therebetween; rather it discloses avoiding a wasteful storage of data in a same memory location.

In optimizing the scheduling in Wuytack et al., conflicts between data accesses in a same processing cycle are considered. A conflict arises if two sets of data are to be accessed in a same processing cycle. In optimizing the scheduling, if two sets of data are stored in a same memory location, access to both of them in a same processing cycle is avoided unless the memory location has enough access ports to accommodate all of the accesses simultaneously. Column 22, lines 6 to 27 (the second of the sections cited by the Examiner as assertedly disclosing the separating step feature of canceled claim 182) describes breaking a program into blocks, which can be represented in a tree structure. A block cycle budget is determined for each block, and optimized scheduling intervals for the execution of

the blocks is determined, such that execution of each block in its allotted cycle is guaranteed. Wuytack et al. explain at column 22, lines 29 to 44 that for determining the block cycle budget, an allowed-conflicts graph, which represents all allowed and disallowed simultaneous data accesses, is used. By comparing the required data accesses for a program block to the allowed-conflicts graph, the number of cycles required for execution of the block can be determined. For example, if data 'A' is stored in a memory location for which there is only one read port, then if a block requires two reads of data 'A', then at least two processing cycles are assigned to the block. For optimizing the schedule, it is described that new allowed conflicts are added iteratively to the allowed-conflicts graph so that the sum of all schedule lengths of the blocks of the application can occur in a required time. *See* Wuytack et al., column 23, lines 5 to 23. Thus, to minimize a time taken to process, new allowed conflicts are added to the allowed-conflicts graph, ***but connection between different ones of the blocks of the graph are not minimized***. In particular, separation of a graph into subgraphs for such minimization of connections therebetween is not disclosed.

Thus, the combination of Campbell et al. and Wuytack et al. does not disclose or suggest all of the features recited in claim 182. Accordingly, the combination of Campbell et al. and Wuytack et al. does not render unpatentable claim 182.

Moreover, Wuytack et al. should not have been used in this rejection because it is non-analogous art with respect to the claimed invention. In order for a reference to be used against a claim in a prior art rejection, the reference must either (1) be from the same field of endeavor as Applicant's invention, or (2) if not from the same field of endeavor, be reasonably pertinent to the problem with which the Applicant is concerned. See M.P.E.P. § 2141.01(a). Applicants' invention pertains to separating datagraphs of a program into subgraphs for distribution among a plurality of hardware modules; Wuytack et al. pertains to non-parallel processing of a program for parts of which execution cycles are assigned. Wuytack et al. make clear that they are not related to the field of parallel processing. In this regard, Wuytack et al., at column 22, line 50, state that the blocks of the program ***cannot be scheduled in parallel***. Wuytack et al. are therefore not of the same field of endeavor. It is therefore respectfully submitted that, for this additional reason, the combination of Campbell et al. and Wuytack et al. does not render unpatentable claim 182.

Furthermore, Campbell et al. relate to a multiprocessor architecture. Wuytack et al., on the other hand, relate to optimization of a memory structure and of an algorithm that provides for access the memory, taking into consideration inclusion of multiple ports for parallel access to memory; Wuytack et al. do not relate to parallel

processing. These references are therefore within two entirely different fields of endeavor. A person of ordinary skill in the art seeking to modify the multiprocessor architecture of Cambpbell et al. would not look to the field of memory optimization. For at least this reason, it is submitted that there is no suggestion in the prior art to combine Campbell et al. and Wuytack et al. For this additional reason, it is respectfully submitted that the combination of Campbell et al. and Wuytack et al. does not render unpatentable claim 180.

Withdrawal of this rejection is therefore respectfully requested.

VI.   Rejection of Claims 179, 181, 185, 187, and 188 Under 35 U.S.C. § 102(e)

Claims 179, 181, 185, 187, and 188 stand rejected under 35 U.S.C. § 102(e) as anticipated by Cooke et al. It is respectfully submitted that Cooke et al. do not anticipate any of the present claims for at least the following reasons.

Claims 179 and 181 relate to a method for programming a system having a cellular structure, and each has been amended herein without prejudice to include subject matter of canceled claim 182 to recite, *inter alia*, the following:

> . . . *separating [a graph] into a plurality of subgraphs . . . wherein the separating step includes separating the [graph] so as to minimize connections between the plurality of subgraphs.*

The Office Action admits that Cooke et al. do not disclose these features. Thus, Cooke et al. do not anticipate either of claims 179 and 181.

With respect to the subject matter of claim 182 (which is now incorporated in amended claims 179 and 181), the Examiner cites the combination of Cooke et al. Wuytack et al. as rendering claim 182 obvious. In support of the rejection, the Examiner asserts that Wuytack et al., at column 14, lines 31 to 41, and column 22, lines 6 to 27, disclose the feature of the separating step including separating the graph so as to minimize connections between the plurality of subgraphs. Without addressing whether Wuytack et al. qualifies as prior art with respect to the sections of Wuytack et al. relied upon by the Examiner, it is respectfully submitted that the combination Campbell et al. and Wuytack et al. does not render unpatentable claim 180 for at least the following reasons.

As set forth above in support of the patentability of claim 180, Wuytack et al. do not disclose the features of separating the graph into subgraphs so as to minimize connections between the plurality of subgraphs. Since the combination of Cooke et al. and Wuytack et al. does not disclose or suggest all of the features recited in either of claims 179 and 181, it is therefore respectfully submitted that the combination of Cooke et al. and Wuytack et al. does not render unpatentable either of these claims.

Furthermore Wuytack et al. should not have been used in the present rejection because Wuytack et al. are non-analogous art with respect to the claimed invention of either of claims 179 and 181, for the same reason set forth above with respect to claim 180. For this additional reason, it is respectfully submitted that the combination of Cooke et al. and Wuytack et al. does not render unpatentable either of these claims.

Furthermore, Cooke et al. relate to a method for compiling high level programming languages into equivalent logic with maximal parallelism for an integrated processor with reconfigurable logic. Wuytack et al., on the other hand, relate to optimization of a memory structure and of an algorithm that access the memory, taking into consideration inclusion of multiple ports for parallel access to memory; Wuytack et al. do not relate to parallel processing or translating one algorithm type into another logic that includes new parallelism for a processor with reconfigurable logic. These references are therefore within two entirely different fields of endeavor. A person of ordinary skill in the art seeking to modify the method of interpreting the programming language into new logic of Cooke et al. would not look to the field of memory optimization. For at least this reason, it is submitted that there is no suggestion in the prior art to combine Cooke et al. and Wuytack et al. For this additional reason, it is respectfully submitted that the combination of Cooke et al. and Wuytack et al. does not render unpatentable either of claims 179 and 181.

As for claims 185, 187, and 188, which depend from claim 181 and therefore include all of the features recited in claim 181, it is respectfully submitted that the combination of Cooke et al. and Wuytack et al. does not render these dependent claims unpatentable for the same reasons set forth above in support of the patentability of claim 181. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988) (any dependent claim that depends from a non-obvious independent claim is non-obvious).

Withdrawal of this rejection is therefore respectfully requested.

VII. Rejection of Claims 190 to 193 Under 35 U.S.C. § 102(e)

Claims 190 to 193 stand rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 5,841,973 ("Kessler et al."). It is respectfully submitted that Kessler et al. do not anticipate any of claims 190 to 193 for at least the following reasons.

Claim 190, as herein amended without prejudice, recites transmitting a data signal and a status from a first cell to a second cell in a method of executing a single program on a system having an array of runtime reconfigurable cells.

Kessler et al. provide for multiple processors that store data in and retrieve data from memories of each others' processors. The multiple processors operate in parallel to perform different programs, during which the storing and retrieval may be performed. Kessler et al., however, do not disclose, or even suggest, that that the storing and retrieving is performed in a method for executing a single program on a system having an array of runtime reconfigurable cells.

Thus, Kessler et al. do not disclose, or even suggest, all of the features recited in claim 190. It is therefore respectfully submitted that Kessler et al. do not anticipate claim 190.

As for claims 191 and 192, which ultimately depend from claim 190 and therefore include all of the features recited in claim 190, it is respectfully submitted that Kessler et al. do not anticipate either of these dependent claims for the same reasons set forth above in support of the patentability of claim 190.

Withdrawal of this rejection is therefore respectfully requested.

VIII. Rejection of Claims 194 to 202 Under 35 U.S.C. § 102(e)

Claims 194 to 202 stand rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,170,051 ("Dowling"). It is respectfully submitted that Dowling does not anticipate any of claims 194 to 202 for at least the following reasons.

Claim 194, as herein amended without prejudice, relates to a method of executing a program on a reconfigurable array of cells, and recites the following:

> . . . *forming a plurality of subgraphs based on a program;*
> *computing a first part of a first one of the subgraphs with a first*
> *cell; after computing, reconfiguring the first cell for computation of*
> *a first part of a second one of the subgraphs; and simultaneously*
> *with the reconfiguring, computing a second part of the first*
> *subgraph with a second cell.*

Dowling refers to execution of ***two different programs***, and does not disclose, or even suggest, forming a plurality of subgraphs of a program where the subgraphs are executed in the interleaved manner recited in claim 194.

The Examiner asserts that Dowling, at column 6, lines 45 to 62, and column 12, lines 34 to 64, discloses the feature of forming a plurality of subgraphs based on a program. With respect to the first cited section, while Dowling may refer to execution of sub-instructions, Dowling does not disclose or suggest that sub-instructions are divided amongst cells as recited in the claim. Instead, the cited section merely indicates that different functional units execute different parts of a particular program. In other words, the indication

in Dowling that sub-instructions are divided amongst cells has nothing to do with the disclosure in Dowling pertaining to Fig. 3, upon which the Examiner relies as allegedly disclosing the computing a second part by one cell while reconfiguring another cell for computation of a first part of a second part. With respect to the discussion regarding Fig. 3 of Dowling, it is indicated that such different execution by different functional units of different parts of a single program *are not performed in the interleaved manner* recited in claim 194. Instead, after computation by the first sub-unit, the second sub-unit performs a second part of the program that was performed by the first program. Simultaneously, a *different program's* instructions -- not a different part of a same program -- is loaded for processing by the first sub-element. Thus, the computing of a second part of a first subgraph of a program by one cell while reconfiguring another cell for computation of a first part of a second subgraph of the same program is not diclosed.

With respect to the second cited section, the cited section is related to parallel execution paths that allow *separate programs* to execute concurrently, and is unrelated to forming a plurality of subgraphs based on a program.

Thus, Dowling does not disclose, or even suggest, all of the features recited in claim 194. It is therefore respectfully submitted that Dowling does not anticipate claim 194.

As for claims 195 to 202, which ultimately depend from claim 194 and therefore include all of the features recited in claim 194, it is respectfully submitted that Dowling does not anticipate any of these dependent claims for the same reasons set forth above in support of the patentability of claim 194.

Withdrawal of this rejection is therefore respectfully requested.

IX.   Rejection of Claims 182 to 184, and 186 Under 35 U.S.C. § 103(a)

Claims 182 to 184, and 186 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Cooke et al. and Wuytack et al. It is respectfully submitted that the combination of Cooke et al. and Wuytack et al. does not render unpatentable any of the present claims for at least the following reasons.

Claim 182 has been canceled herein without prejudice, rendering moot the present rejection with respect to claim 182.

Claims 183, 184, and 186 depend from claim 181 and therefore include all of the features recited in claim 181. It is therefore respectfully submitted that the combination of Cooke et al. and Wuytack et al. does not render unpatentable any of these dependent

claims for the same reasons set forth above in support of the patentability of claim 181. *In re Fine, supra.*

Withdrawal of this rejection is therefore respectfully requested.

X.   Rejection of Claim 189 Under 35 U.S.C. § 103(a)

Claim 189 stands rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Cooke et al. and U.S. Patent No. 6,301,706 ("Maslennikov et al."). It is respectfully submitted that the combination of Cooke et al. and Maslennikov et al. does not render unpatentable claim 189 for at least the following reasons.

Claim 189 depends from claim 181 and therefore includes all of the features recited in claim 181. Maslennikov et al. do not correct the deficiencies noted above with respect to Cooke et al. (or the combination of Cooke et al. and Wuytack et al.). It is therefore respectfully submitted that the combination of Cooke et al. and Maslennikov et al. does not render unpatentable this dependent claim for the same reasons set forth above in support of the patentability of claim 181. *Id.*

Withdrawal of this rejection is therefore respectfully requested.

XI.   New Claim 203

Claim 203 has been added herein. It is respectfully submitted that new claim 203 does not add any new matter and is fully supported by the present application, including the Specification. It is respectfully submitted that claim 203 is patentable over the relied upon art for at least the following reasons.

Claim 203 relates to a method for programming a system having a cellular structure, and recites, *inter alia*, the following:

> *. . . extracting from a program at least one of a data flow graph and a control flow graph; . . . wherein: the extracting step includes, for a conditional instruction, extracting a plurality of different subgraphs, each representing a different instruction path of the conditional instruction; and for each one of the different subgraphs, execution of the subgraph is dependent on an evaluation of the conditional instruction.*

The Examiner incorrectly asserts that Maslennikov et al. disclose these features. Maslennikov et al. provide for copying entire loops so that there are two or more of the ***same instruction paths***, but do not disclose or suggest extracting for a conditional instruction, subgraphs that represent ***different instruction paths*** of the conditional

instruction, where execution of each of the subgraphs is dependent on the conditional instruction evaluation.

XII. Conclusion

In light of the foregoing, it is respectfully submitted that all pending claims are in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully submitted,

Dated: _28 Ju_, 2006   By: _____

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